

REMARKS/ARGUMENTS

The applicant acknowledges, with thanks, the Office Action dated March 26, 2010. The Examiner's acceptance of the drawings filed on October 14, 2009, is noted with appreciation. Claims 1-6 have been amended herein. No claims were canceled and claims 8-17 are newly added. Accordingly, claims 1-17 are currently pending.

The amendments present no new matter. In particular, the axisymmetric body being disposed within the reactor shell and being axisymmetric relative to an axis is shown in Figures 2 and 3, and described in the specification as published such as for example at paragraphs [0006], [0018], and [0019]. The annular axisymmetric body being disposed on an inside surface of the reactor shell, and being axisymmetric about the axis is also shown in Figures 2 and 3, and described in the specification as published such as for example at paragraphs [0006], [0018], and [0019]. Further, the axisymmetric body being formed by rotating a single curved line without a straight line portion and comprised of at least two curved portions having different radii, as a generatrix, around the axis is also shown in Figures 2 and 3, was described in the specification as published such as for example at paragraphs [0005], [0018], and [0019], and was included as a feature of independent claim 1 as originally filed. Yet still further, the rotator body member being disposed within the cylindrical reactor shell having a smooth inner surface and being arranged coaxially relative to the annular body member and relative to the smooth inner surface along an axis as set out in newly added independent claim 8 axis is also shown in Figures 2 and 3 and was described in the specification as published such as for example at paragraphs [0005] and [0006]. In addition, the rotator body member being arranged coaxially relative to the annular body member along an axis with a selected distance between the rotator body member and the annular body member to permit associated feedstock to pass through the multiphase reactor is disclosed at paragraph [0006].

Reconsideration of the application as amended is respectfully requested.

The Office Action

Claim 3 was objected to in the Office Action of March 26, 2010. Also, claims 1-7 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In addition, claims 1-5 and 7 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S.

Patent No. 3,523,762 to Broughton. Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over Broughton. Claims 1, 2, and 5-7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,741,466 to Bodnaras.

In view of the amendments and arguments set forth below, it is submitted that all pending claims are patentably distinct over the art of record.

The Non-Art Matters

As noted above, claim 3 was objected to in the Office Action of March 26, 2010. The Examiner noted that the claim recited a feature already contained in independent claim 1.

Claims 1 and 3 have been amended to correct the informalities objected to by the Examiner.

In addition to the above, claims 1-7 were rejected as being indefinite. In particular, the Examiner took the position that, regarding claim 1, it was unclear as to the structural feature the applicant is attempting to recite by "the axisymmetric body and annular axisymmetric body being formed by rotating a single curved line around the axis" because it was unclear to the Examiner as to what the applicant meant by "a single curved line."

Applicant has tendered an amendment to independent claim 1 herein to clarify the language wherein the axisymmetric body is formed by rotating a single curved line without a straight line portion and is comprised of at least two curved portions having different radii, as a generatrix, around the axis. Accordingly, the claim no longer recites that the annular axisymmetric body are formed by rotating a single curved line.

In accordance with the above, therefore, it is respectfully submitted that all claims are in proper form and in condition for allowance under 35 U.S.C. §112.

The Art Matters

As noted above, claims 1-5 and 7 were rejected as being anticipated by Broughton and claim 6 was rejected as being unpatentable over Broughton. Also, claims 1, 2, and 5-7 were rejected as being unpatentable over Bodnaras.

Applicant has tendered amendments to the claims herein to clarify the claims as noted above and, it is respectfully submitted that in view of those amendments, the claims are novel, patentably distinct and unobvious over the art of record.

In particular, as amended, independent claim 1 recites a multiphase reactor configured to facilitate contact between first and second fluids flowing through the multiphase reactor, the multiphase reactor comprising a reactor shell, an axisymmetric body disposed within the reactor shell, and an annular axisymmetric body. The axisymmetric body disposed within the reactor shell is axisymmetric relative to an axis. The annular axisymmetric body is disposed on an inside surface of the reactor shell, and is axisymmetric about the axis. Further, the axisymmetric body is formed by rotating a single curved line without a straight line portion and comprised of at least two curved portions having different radii, as a generatrix, around the axis.

Neither Broughton nor Bodnaras, alone or in combination teach or suggest a multiphase reactor having the novel structure as set out in the claim. The Examiner cited to the baffle means 4 and 11 of Broughton as an alleged teaching of the axisymmetric body of the multiphase reactor of claim 1 of the instant application. However, applicant does not concede that the baffle means 4 and 11 of Broughton are axisymmetric bodies of a multiphase reactor structurally or functionally the same as the baffles of the present application at least for reasons provided in the previous Amendment. The alleged Broughton baffle means 4 of Figure 1 are flat and as such are comprised of straight line portions, and the alleged Broughton baffle means 11 of Figure 2 have a single common arc in accordance with a single and repeated common arc function. In the present application, however, and as recited in amended claim 1, the axisymmetric body of the multiphase reactor is formed by rotating a single curved line without a straight line portion and comprised of at least two curved portions having different radii, as a generatrix, around an axis of the reactor.

In addition to the above, the Examiner cited to curved surfaces shown in the Figures of Bodnaras for an alleged teaching of the axisymmetric body of the multiphase reactor of claim 1 of the instant application. However, applicant does not concede that the surfaces of Bodnaras have the same structure as the axisymmetric body of the multiphase reactor of claim 1 as amended. In particular, as can be seen in Figures 4 and 6a of Bodnaras, all of the arcs of the structure disclosed thereof have the same radii. In claim 1, however, the axisymmetric body of the multiphase reactor is formed by rotating a single curved line comprised of at least two curved portions having different radii, as a generatrix, around an axis of the reactor. Further, Figure 5 of Bodnaras shows a structural element 66 with a body having a flat surface formed of a straight line portion in the region noted as 68 in the drawing. Again, however, the axisymmetric body of

the multiphase reactor of amended claim 1 is formed by rotating a single curved line without a straight line portion as a generatrix, around an axis of the reactor.

In accordance with the above, therefore, neither Broughton nor Bodnaras, alone or in combination teach or suggest a multiphase reactor having the novel structure as set out in independent claim 1 as amended. Claims 2-7 depend from claim 1.

It is respectfully submitted therefore that claim 1 and claims 2-7 dependent therefrom are novel, patentably distinct and unobvious over the art of record.

Further, it is respectfully submitted that neither Broughton nor Bodnaras, alone or in combination teach or suggest a multiphase reactor having the novel structure as set out in newly added independent claim 8. Claims 9-12 depend from new claim 8.

In claim 8, the cylindrical reactor shell has a smooth inner surface. At least this feature is not shown in Bodnaras. In addition, the rotator body member is disposed within the cylindrical reactor shell and is arranged coaxially relative to the annular body member along an axis, wherein the rotator body member overlaps the annular body member in a direction of the axis, and wherein the rotator body member overlaps the smooth inner surface of the cylindrical reactor shell in the direction of the axis. In Broughton, the structure alleged to be the inner baffle means 4, 11 do not overlap the outer concave baffle means 12, 18 and are instead separated or spaced apart along the central vertical axis represented as a dashed line in Figure 2.

For at least the above reasons, it is respectfully submitted therefore that new claim 8 and claims 9-12 dependent therefrom are novel, patentably distinct and unobvious over the art of record.

Further, it is respectfully submitted that neither Broughton nor Bodnaras, alone or in combination teach or suggest a multiphase reactor having the novel structure as set out in newly added independent claim 13. Claims 14-17 depend from new claim 13.

In claim 13, the annular body member and the rotator body member overlap along an axis, the rotator body member has an outer diameter Φ_{DA} greater than an inner diameter Φ_{DB} of the annular body member, and the members are arranged coaxially along the axis with a selected distance therebetween to permit associated feedstock to pass through the multiphase reactor. Bodnaras discloses no such structural arrangement. Further, the structure disclosed in Broughton defines a fluids-solids contacting chamber for collecting solids therein, which is a different

technical field from the recited structure whereby associated feedstock is permitted to pass through the multiphase reactor, rather than accumulate therein as in Bodnaras.

For at least the above reasons, it is respectfully submitted therefore that new claim 13 and claims 14-17 dependent therefrom are novel, patentably distinct and unobvious over the art of record.

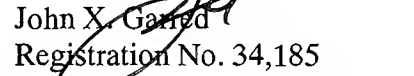
Conclusion

In accordance with the afore-noted amendments and comments, it is submitted that all claims are patentably distinct over the art, and in condition for allowance thereover. An early allowance of all claims is respectfully requested.

If there are any fees necessitated by the foregoing communication, the Commissioner is hereby authorized to charge such fees to our Deposit Account No. 50-0902, referencing our Docket No. 78199/00002.

Respectfully submitted,

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